



§ SPECIFICATION APPROVAL SHEET §

**Fdt Tech Module No**      **LT070T8xA0-FDR**

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**Description:**            **7" Digital TFT-LCD Module**

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**SPEC No.:**                **SAS-1012007**

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**Version:**                 **0.0**

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※ This approval sheet contains 16 pages including the cover and appendix.

**Customer:** \_\_\_\_\_ **APPROVED BY:** \_\_\_\_\_

**Date:**        /        / 11

**APPROVED BY:**

**CHECKED BY:**

**DESIGNED BY:**

\_\_\_\_\_

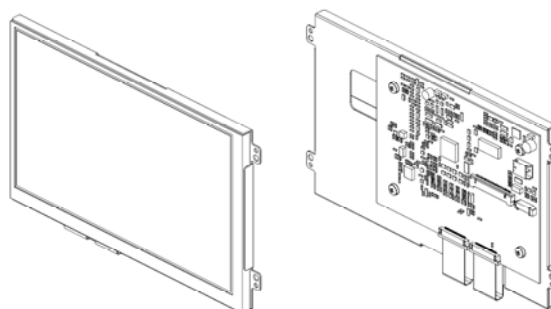
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# FLAT DISPLAY TECHNOLOGY

## 7" Digital TFT-LCD Module



### ■ LT070T8xA0-FDR

## 1. General Descriptions

### 1.1 Features

- 18bits LVDS interface
- Image Reversion: Up/Down and Left/Right
- LED Backlight Circuit Operation Voltage: +5V
- Support Touch Screen Function (Option)

### 1.2 Applications

- Portable product
- Industrial
- Hand-held
- Security
- Instrument Display
- Office Electronics

### 1.3 Application Precautions

Do not use the products herein for the following equipment which demands extremely high performance in terms of functionality, reliability, or accuracy.

- Aerospace equipment
- Communication equipment for trunk lines.
- Control equipment for the nuclear power industry.
- Medical equipment related to life support, etc.

The other application that demands high reliability and functionality should first contact a sales representative.

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## 2. Contents

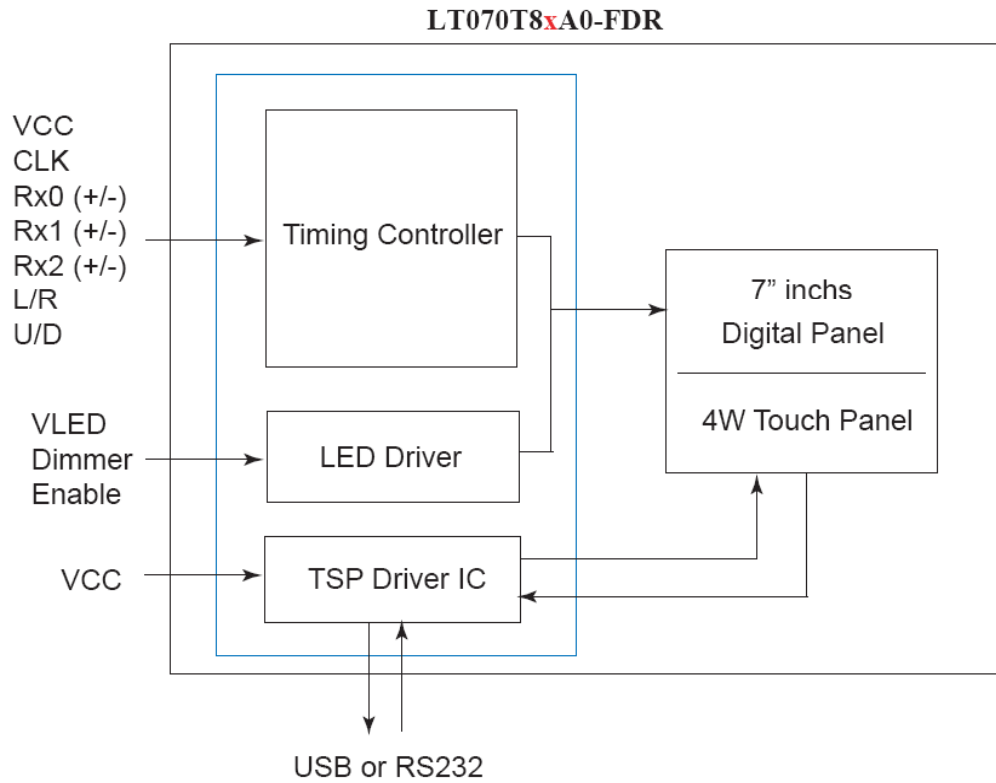
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### 3. Block Diagram

#### 3.1 Block Diagram



TFT

## 4. TFT-LCD Information

### 4.1 TFT-LCD Mechanical Specifications

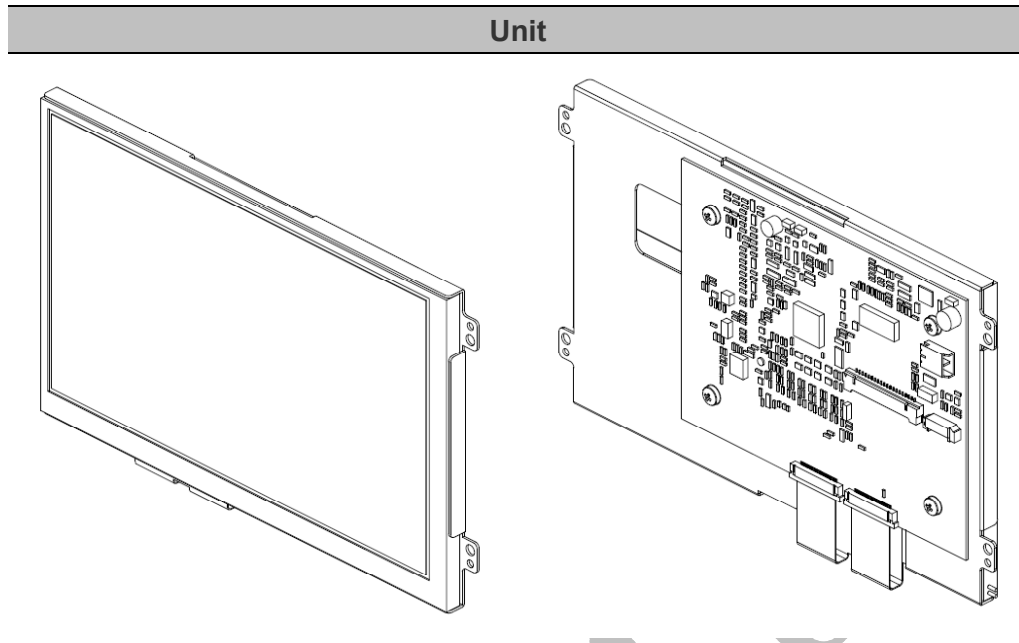
Parameter	Specifications	Unit
Screen Size	7 (Diagonal)	inch
Display Format	800 x (R.G.B) x 480	dot
Display Mode	Normally white, Transmissive	
Active Area	152.4(H) x 91.44(V)	mm
Pixel Pitch	0.1905(H) x 0.1905(V)	mm
Surface Treatment	Anti-glare	
Weight	370±20(Typ)	g

### 4.2 TFT-LCD Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Left	60	70	-	deg	
		Right	60	70	-	deg	
	Vertical	Top	40	50	-	deg	
		Bottom	60	70	-	deg	
Contrast Ratio	CR	At optimized Viewing angle	400	500	-		
Response time	Rise Fall	Tr	-	10	20	ms	
		Tf	-	15	30	ms	
Uniformity	U		70	75	-	%	
Brightness	L	$\theta = 0^\circ / \phi = 0$	200	250	-	cd/m <sup>2</sup>	
Brightness With TSP	L	$\theta = 0^\circ / \phi = 0$	160	200	-	cd/m <sup>2</sup>	
White Chromaticity	x	$\theta = 0^\circ$	0.26	0.31	0.36		
	y	$\theta = 0^\circ$	0.28	0.33	0.38		
LED Life Time			20000			Hrs	

## 5. Order Information

### 5.1 Unit



Parameter	LT070T80A0-FDR	LT070T81A0-FDR	LT070T82A0-FDR
Signal Input Connector	20 PIN	20 PIN	20 PIN
Touch Panel Type	-	4W Resistive	4W Resistive
Touch Screen Interface	-	USB	RS-232
Bracket	⊙	⊙	⊙

**Note: 1. The tape in back of the bracket is to avoid the panel falling from the unit in delivery.**

**2. It's just a temporary adhesion.**

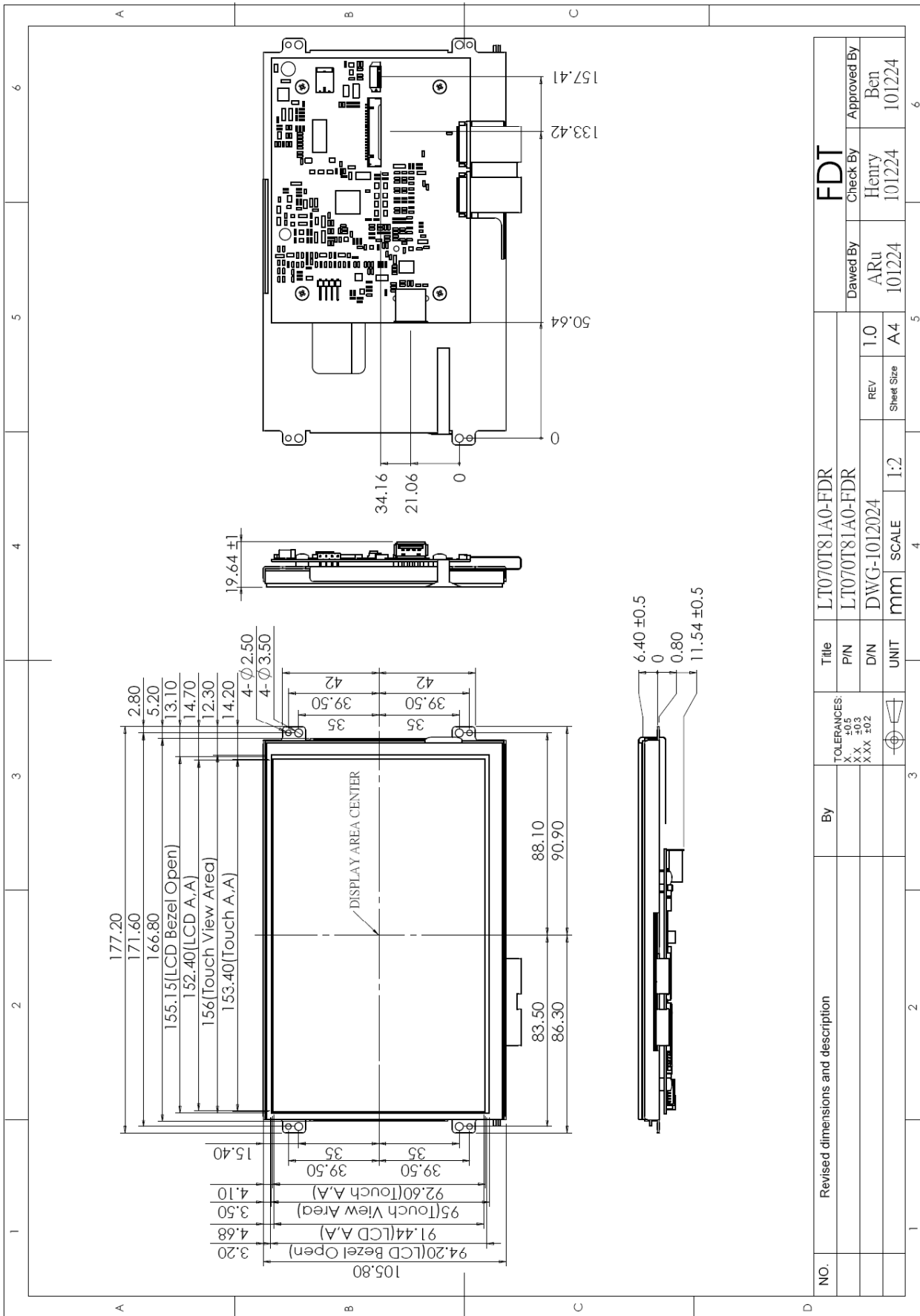
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**6.2 Unit (LT070T81A0-FDR)**



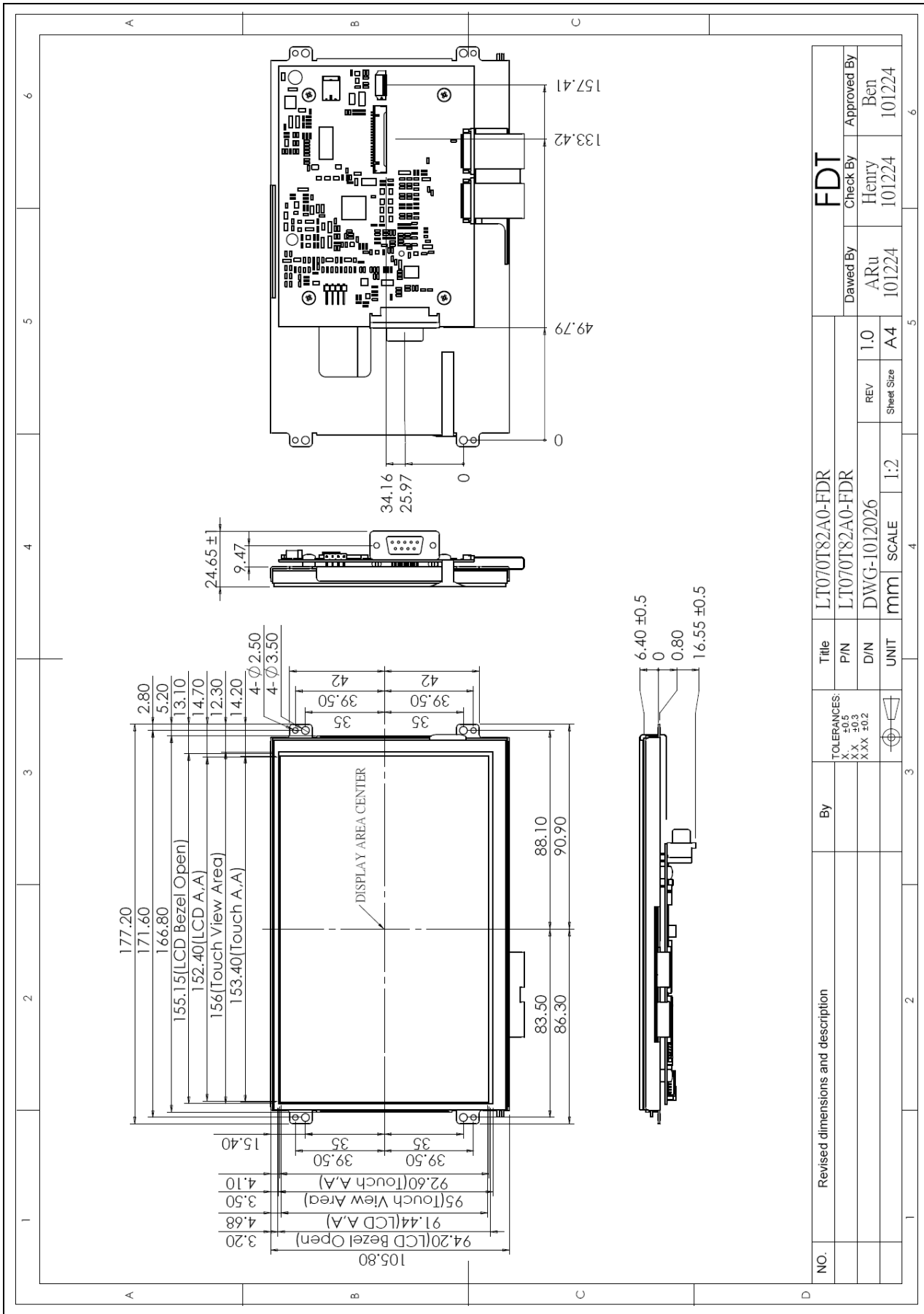
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6.3 Unit (LT070T82A0-FDR)



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## 7. Pin Description

### 7.1 J501A : LVDS I/O Terminals (Pitch 1.25mm 20Pin, Side Entry Type)

※ Connector Part No.: FI-SEB20P-HF13E (JAE) or MS240420G (STM) ; Matching Connector Part No.: FI-S20S (JAE) or P240420 (STM)

Pin No	Symbol	I/O	Description	Remark
1	VCC	I	Power Supply ( 3.3 V )	
2	VCC	I	Power Supply ( 3.3 V )	
3	GND	P	Ground	
4	GND	P	Ground	
5	RX0-	I	Differential Data Input, CH0 ( Negative )	R0 ~ R5, G0
6	RX0+	I	Differential Data Input, CH0 ( Positive )	
7	GND	P	Ground	
8	RX1-	I	Differential Data Input, CH1 ( Negative )	G1 ~ G5, B0, B1
9	RX1+	I	Differential Data Input , CH1 ( Positive )	
10	GND	P	Ground	
11	RX2-	I	Differential Data Input , CH2 ( Negative )	B2 ~ B5, DE, Hsync, Vsync
12	RX2+	I	Differential Data Input , CH2 ( Positive )	
13	GND	P	Ground	
14	CLK-	I	Differential Clock Input ( Negative )	LVDS Level Clock
15	CLK+	I	Differential Clock Input ( Positive )	
16	GND	P	Ground	
17	L/R	I	Horizontal Display Mode Select Signal	Note
18	U/D	I	Vertical Display Mode Select Signal	Note
19	GND	P	Ground	
20	GND	P	Ground	

Note: The definitions U/D & R/L

L/R=High , U/D=High



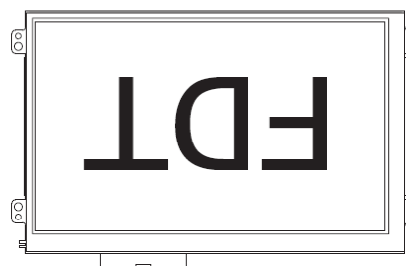
L/R=Low , U/D=High



L/R=High , U/D=Low



L/R=Low , U/D=Low

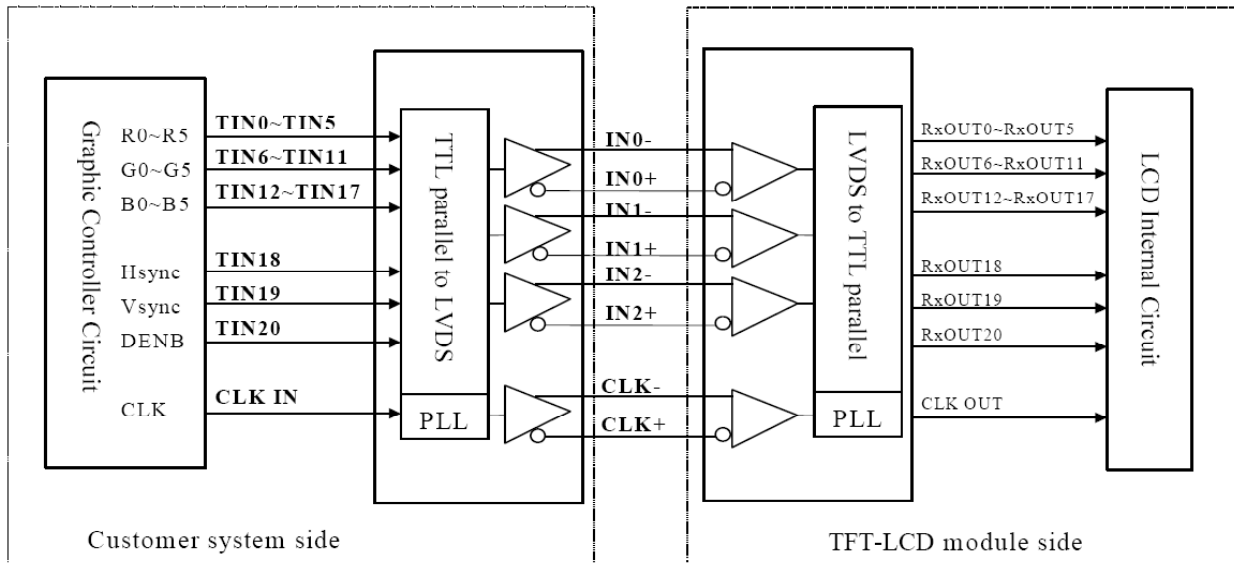


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## LVDS Interface Block Diagram



### 7.2 J502: Pin Assignment of Inverter (Pitch 1.25mm 6Pin, Side Entry Type)

※ Connector Part No.: 53261-0619 (MOLEX) or MS24016R (STM); Matching Connector Part No.: 51021-0600 (MOLEX) or P24016 (STM)

Pin No	Symbol	I/O	Description	Remark
1	VLED	-	Power Voltage For LED Backlight Circuit (+5V)	
2	VLED	-	Power Voltage For LED Backlight Circuit (+5V)	
3	DIMMER	O	Backlight Brightness Adjust	
4	ENABLE	O	Enable For LED Backlight	
5	GND	-	Power Ground	
6	GND	-	Power Ground	

### 7.3 J401C : Pin Assignment of Touch USB (USBA-Female 2.0mm, Side Entry Type )(Option)

Pin No	Symbol	I/O	Description	Remark
1	DGND	-	Digital Ground	
2	D+	-	DATA (+)	
3	D-	-	DATA (-)	
4	VBUS	-	USB VCC	

#### 7.4 J401D : Pin Assignment of Touch RS232 (D-SUB 9 MALE)(Option)

Pin No	Symbol	I/O	Description	Remark
1	NC	-	No Connection	
2	RXD	-	Receive Data	
3	TXD	-	Transmit Data	
4	NC	-	No Connection	
5	GND	-	Ground	
6	NC	-	No Connection	
7	NC	-	No Connection	
8	NC	-	No Connection	
9	NC	-	No Connection	

## 8. Absolute Maximum Ratings

### 8.1 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Remark
Input Voltage	Vcc	+3	+3.6	V	
LED Driver Input Voltage	VLED	+4.5	+5.8	V	
Digital Input Signal	TTL	Vcc-0.5	Vcc+0.5	V	
Operating Temperature		-20	+70	°C	
Storage Temperature		-30	+80	°C	
Operating Temperature With TSP		-20	+70	°C	
Storage Temperature With TSP		-30	+80	°C	

## 9. Recommended Operating Conditions

### 9.1 Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note	Remark
Input Voltage	Vcc	+3.1	+3.3	+3.5	V		
Total Current	Icc	-	210	-	mA		@+3.3V
LED Driver Input Voltage	VLED	+4.8	+5	+5.5	V		
LED Driver Current	ILED	-	420	-	mA		@+5V
LED Driver Power Consumption		-	2.1	-	W		@+5V
Digital Input Signal	TTL	Vcc-0.3	Vcc	Vcc+0.3	V		
Dimmer Adjust	Dimmer	0(Dark)	-	+3.3(Bright)	V	Floating:1/2 VCC	Positive
Enable Backlight	Enable	0		+3.3	V		1: Enable 0: Disable

Note: Please input VCC if the function of the backlight unit needs to be worked normally. Please do not input VLED only.

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## 10. Interface Timing

### 10.1 Timing Parameters

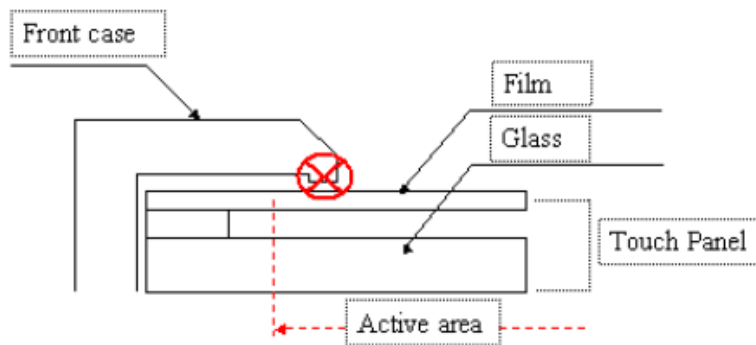
Parameter	Symbol	Min	Typ	Max	Unit
DCLK frequency	Fdclk	-	40	45	MHz
DCLK cycle	Tcph	22	25	-	ns
DCLK pulse width	Tcw	8	-	-	ns
Data set-up time	Tsu	4	-	-	ns
Data hold time	Thd	2	-	-	ns
Time that the last data to LD	Tld	1	-	-	Tcph
Pulse width of LD	Twld	2	-	-	Tcph
Time that LD to STHL/R	Tlds	5	-	-	Tcph
POL set-up time	Tpsu	6	-	-	ns
POL hold time	Tphd	6	-	-	ns
CKV frequency	Fvclk	-	-	200	KHz
CKV rise time	Trck	-	-	100	ns
CKV falling time	Tfck	-	-	100	ns
CKV pulse width	PWCLK	500	-	-	ns
Horizontal display timing range	Tdh	-	800	-	Tcph
Horizontal timing range	Th	-	1056	-	Tcph
STVU/D setup time	Tsuv	200	-	-	ns
STVU/D hold time	Thdv	300	-	-	ns
STVU/D delay time	Tdt	-	-	500	ns
Driver output delay time	Tdo	-	-	900	ns
Output rise time	Ttlh	-	500	1000	ns
Output falling time	Tthl	-	400	800	ns
OEV pulse width	Twcl	1	-	-	us
OEV to Driver output delay time	Toe	-	-	900	ns
Horizontal lines per field	Tv	512	525	610	Tdh
Vertical display timing range	Tvd	-	480	-	Tdh

## 11. 4W Resistance Touch Panel Characteristics

### 11.1 Touch Screen Integration Design Guide

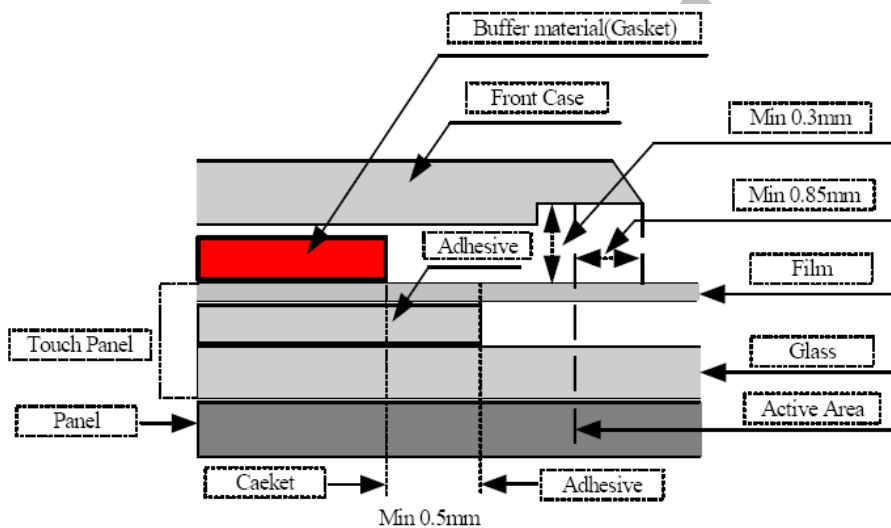
Avoid the design that Front-case overlap and press on the active area of the touch-panel.

Give enough gap (over 0.5mm at compressed) between the front case and touch-panel to protect wrong operating.



Use a buffer material (Gasket) between the touch-panel and front-case to protect damage and wrong operating.

Avoid the design that buffer material overlap and press on the inside of touch-panel viewing area.



**Note:** We strongly suggest to follow above design guide to avoid the linear defect happened on the touch panel.

### 11.2 Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Remark
<b>Terminal Resistance</b>	X	500	720	940	Ω	
	Y	200	300	400	Ω	
<b>Linearity</b>		-	-	1.5	%	
<b>Insulation Impedance</b>		20	-	-	MΩ	DC 25V
<b>Response Time</b>		-	-	15	ms	

### 11.3 Optical Performance

Parameter	Specifications
Light Transmittance	$\geq 80\%$
Haze	Min.1%

### 11.4 Mechanical Performance

Parameter	Specifications
Input Method	Finger or stylus pen
Operating Force	$\leq 80g$
Surface Hardness	3H or more
Static Load Resistance	5Kg / 25 cm <sup>2</sup>
Impact Resistance	$\phi$ 9 mm steel ball, 60cm height

### 11.5 Durability Performance

Parameter	Specifications
Hitting Durability	$\geq 1000000$ times, with R8.0 mm silicon rubber, 250g, 3 times / sec
Sliding Durability	$\geq 100000$ times, with R0.8 mm polyacetal stylus, 250g, 60 mm / sec

### 11.6 Environmental

Parameter	Specifications
Operating Temp.	-20°C~70°C (Except dew condensation)
Storage Temp.	-30°C~80°C (Except dew condensation)

### 11.7 Reliability Test Procedure

Parameter	Specifications
High temperature storage test	80°C for 240 hours.
Low temperature storage test	-30°C for 240 hours.
Thermal Cycling	-30°C (30 min)~80°C (30 min) for 100 cycles.
High temperature and high humidity	60°C, 90%RH for 240 hours.

## 12. Operation Manual

### 12.1 Driver Board Manual

